CLAIMS

We claim:

1. A method of attenuating jet engine noise comprising:

increasing air velocity adjacent to an inlet fan duct outer wall, to a greater rate than typical velocity of an operational engine ambient inlet airflow adjacent to said inlet fan duct outer wall;

reducing a boundary layer and associated turbulence adjacent to said inlet fan duct outer wall; and

optimizing refraction and absorption of inlet sound into an acoustic liner along said inlet fan duct outer wall.

2. The method as in claim 1, wherein said increasing air velocity comprises injecting air adjacent to said inlet fan duct outer wall and substantially directed aft a fan rotor, wherein said injected air is distinct from ambient inlet air.

3. The method as in claim 2, wherein said injecting air comprises extending air injection axially.

4. The method as in claim 2, wherein said injecting air comprises extending air injection with substantial circumferential uniformity.

5. The method as in claim 2, wherein said injecting air comprises injecting a mass-flow rate of air within a range of one percent to two percent of said ambient inlet air.

6. The method as in claim 2, wherein said injecting air further comprises drawing air from at least one of a bypass flow stream and a core flow stream, wherein drawing air

from said bypass flow stream comprises drawing air downstream a fan rotor and upstream a fan discharge outlet guide vane.

7. The method as in claim 6, further comprising creating a pressure difference to self-aspirate said injecting air, wherein said inlet fan duct area has a first variable pressure, said bypass flow stream has a second variable pressure, and said core stream has a third variable pressure.

8. The method as in claim 1, wherein said increasing air velocity comprises exerting a suction force on ambient inlet air adjacent to said inlet fan duct outer wall.

9. The method as in claim 8, wherein said exerting a suction force comprises drawing a mass-flow rate of said ambient inlet air within a range of one percent to two percent of said ambient inlet air.

10. The method as in claim 8, wherein said exerting a suction force further comprises injecting air aft said fan discharge outlet guide vane.

11. The method as in claim 1, wherein said jet engine includes turbofans, turbojets, turbopropellers, turboshafts, ramjets, rocket jets, pulse-jets, turbines, gas turbines, steam turbines, commercial engines, corporate engines, military engines, marine engines.

12. A method of attenuating jet engine noise comprising:

increasing air velocity adjacent to a bypass duct outer wall, to a greater rate than typical velocity of an operational engine bypass airflow adjacent to said bypass duct outer wall;

reducing a boundary layer and associated turbulence adjacent to said bypass duct outer wall; and

optimizing refraction and absorption of sound into an acoustic liner along said bypass duct outer wall.

13. The method as in claim 12, wherein said increasing air velocity comprises one of injecting air adjacent to said bypass duct outer wall and exerting a suction force on air adjacent to said bypass duct outer wall.

14. The method as in claim 13, wherein said injecting air comprises extending air injection at least one of axially and with substantial circumferential uniformity.

15. The method as in claim 13, wherein said injecting air comprises injecting a mass-flow rate of air within a range of one percent to two percent of said ambient inlet air.

16. The method as in claim 13, wherein said exerting a suction force comprises exerting a suction force at least one of axially and with substantial circumferential uniformity.

17. The method as in claim 13, wherein said exerting a suction force comprises drawing a mass-flow rate of air within a range of one percent to two percent of said ambient inlet air.

18. The method as in claim 12, wherein said jet engine includes turbofans, turbojets, turbopropellers, turboshafts, ramjets, rocket jets, pulse-jets, turbines, gas turbines, steam turbines, commercial engines, corporate engines, military engines, marine engines.

19. A system to attenuate jet engine noise comprising:

a fluid duct for increasing air velocity adjacent to an inlet fan duct outer wall, to a greater rate than typical velocity of an operational engine ambient inlet airflow adjacent to said inlet fan duct outer wall;

wherein said fluid duct has a first end with a slot therein opening to said inlet fan duct outer wall, a body, and a second end with a slot therein opening to aft of a fan rotor.

20. The system as in claim 19, wherein said fluid duct is structured of sufficient dimension for allowing a mass flow rate of air within a range of one percent to two percent of said ambient inlet air.

21. The system as in claim 19, wherein said first end having a slot therein further comprises one of a contiguous slot therein and a segmented slot therein.

22. The system as in claim 19, wherein said first end having a slot therein disposed circumferentially along said inlet fan duct outer wall.

23. The system as in claim 19, wherein said second end is smaller in width than said body, said second end structured to provide a steep expansion in width connecting to said body.

24. The system as in claim 19, wherein said fluid duct is structured to provide a plenum.

25. The system as in claim 19, wherein at least one of said first end having a slot therein, said second end having a slot therein and said body is structured in an annular form.

26. The system as in claim 19, wherein said fluid duct is substantially disposed within a nacelle.

27. The system as in claim 19, wherein said jet engine includes turbofans, turbojets, turbopropellers, turboshafts, ramjets, rocket jets, pulse-jets, turbines, gas turbines, steam turbines, commercial engines, corporate engines, military engines, marine engines.

28. A system to attenuate jet engine noise comprising:

a nacelle surrounding a fan rotor and a fan discharge outlet guide vane; said nacelle having an inlet fan duct outer wall;

an acoustic liner attached to said nacelle;

a turbine shaft for generating motive forces on said fan rotor; and

a fluid duct for increasing air velocity adjacent to said inlet fan duct outer wall, to a greater rate than typical velocity of an operational engine ambient inlet airflow adjacent to said inlet fan duct outer wall;

wherein said fluid duct has a first end with a slot therein opening to said inlet fan duct outer wall, a body, and a second end with a slot therein opening to aft of said fan rotor.

29. The system as in claim 28, wherein said fluid duct is structured of sufficient dimension for allowing a mass flow rate of air within a range of one percent to two percent of said ambient inlet air.

30. The system as in claim 28, wherein said first end having a slot therein further comprises one of a contiguous slot therein and a segmented slot therein.

31. The system as in claim 28, wherein said first end having a slot therein disposed circumferentially along said inlet fan duct outer wall.

32. The system as in claim 28, wherein said second end is smaller in width than said body, said second end structured to provide a steep expansion in width connecting to said body.

33. The system as in claim 28, wherein said fluid duct is structured to provide a plenum.

34. The system as in claim 28, wherein at least one of said first end having a slot therein, said second end having a slot therein and said body is structured in an annular form.

35. The system as in claim 28, wherein said fluid duct is substantially disposed within said nacelle.

36. The system as in claim 28, wherein said jet engine includes turbofans, turbojets, turbopropellers, turboshafts, ramjets, rocket jets, pulse-jets, turbines, gas turbines, steam turbines, commercial engines, corporate engines, military engines, marine engines.